E-949 TN-xxx
April 24, 2007

Experiment 949
Technical Note No. xxx

Pass2 Code Modifications from PNN1 version.

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Abstract

This note is to detail changes that have occurred in the development of the Pass2 code from E949-PNN1 analysis until the present E949-PNN2 analysis.

1 Introduction

2 Completely New Code

2.1 TGRecon

tgpfcn.F init_geom.F kink_fcn.F minuit_code.F tgpif.F fcn.F hitfib.F sqgeom.F kink_tgpif.F kink_finder.F tgrecon_fill.F kink_routines.F kinks.cmn tgrecon.cmn tgpif.inc debug_mess.cmn sw_bad_check.cmn trk_ordering.cmn fitstuff.inc geom.inc tgpkaon.inc sortfcn.inc myminu.inc p2_cerenkov.cmn p2_cerenpov.cmn tdxunp.cmn

3 Bug Fixes

3.1 analyze_bwpc2_mod.F

Corrected typo/bug which makes the y-hit position wrong. Also, commented out invalid code.

3.2 setup_bmccd.F

05-Nov-2004 Put bounds on loop with iccd() because the routine was trying to access the 256^{th} element. `min(istart+7,255)`.

3.3 ad_01.F

Added trs as an input. Before the routine declared the variable locally but never assigned a value to it, so the value would float.

3.4 setup_pass1.F

24-May-04 Fixed error which occured when there were two or more tracks found by utc_track and rdut_match picked a track not equal to 1. During the refit with TG fibers only one possible track is returned, but idctrk was not redefined. See TN K-062 that details this bug fix.

4 Improvements to Code

4.1 Calibration add ons

Jim Frank and Dima Patalakha re-calibrated the target fiber positions in 2004. They added new parameters in the fiber position geometry file, tg_zsl.xxxxx. Therefore code requiring tg fiber position had to be modified.

```
y = y + 0.0072*zpi     was changed to
y = y + zsly*zpi + zsly0
x = x + zslx*zpi + zslx0
```

`zpi` is *tgz*, the decay vertex z-position. zslx,zsly,zslx0,zsly0 are new parameters in the `tg_zsl` files stored in $CAL_DB. As one can observe the previous version had hard-coded zsly=0.0072 and zsly0=0.0 and had no correction for the x positions. The current tg_zsl.02003 file have the following values: zslx=0.00084, zsly=0.01077, zslx0=-0.0056, zsly0=-0.0229.

4.2 TGRecon improvement to Swathccd

4.3 ad_01.F

Changed arrray dimensions from 50 to MAX_AD_CCD_HITS (which is set to 80 in p2_phveto.cmn) for the following adtim_cd,adsec_ccd, adhmx_ccd. Added a section to fill PV block from the CCD info: npvad2, tpvad2, epvad2, elempvad2.

4.4 anal_bm_ccd.F

Changed the bit tofitad to .true. So as to fit the CCD pulses. So additional initialization of variables. Also, moved the section in which the AD CCD pulses were being stored. Currently placed as to store all raw pulses, if there is a non-zero bin, (adccdn(ad sector).gt.0. Also, allow the storage of 12 pulse (previously stored only 3).

4.5 pass2_pv_new.F

05-Nov-2004 Increased array bounds to 20 on iu1, iu2 07-Mar-2005 Changed multiplexing of AD Fixed the AD multiplexing Added initialization of BVL hits (epvbl, tpvbl, bltdc1, bltdc2). Added BLtdc1,BLtdc2 tdc/td timing flag. Changed iqual_swccd.le.1 to iqual_swccd.ne4 to allow TGRecon reconstructed information to be stored in the photon veto common block. DPV code: Changed tdcunp from ttrs±100 to 0.,2000. Also changed the tavg calibration for DPV from 7000. to 7436.4

4.6 intse3.F

Added tdc/td timing flag for BL (tdcsastbl,tdcbastbl,tdc1sabtbl,tdc2sabtbl,tdc1nabtbl,tdc2nabtbl).

4.7 setup_pass2.F

Make it so setup_tg is called when TGrecon is able to reconstruct the event. Call Toshio's Fitter (tgpif()) and store the information in the ntuple block. Add a call to NCTEM2 for the new KINK cut.

4.8 setup_pass1.F

l0z2 = RR2_CUT(1) was added. Initialization of kink information and store final information depending on the swathccd return codes. During the UTC refit with pion fiber information from the target, the code does not include pions that where classified as a pion hit before a target scatter. Events flagged as a target scatter are refit with pion fibers after the scatter occurs. 25-March-2004 xpi, ypi have a new correction factor. ypi(j) = ypi(j) + zsly*zpi + zsly0 xpi(j) = xpi(j) + zslx*zpi + zslx0 These are input parameters from the CFM database, called in sqgeom.F.

4.9 evtsel.F

Changed the definition of tgcut. IF (itgqualt.ge.2) tgcut = 0 changed to IF (itgqualt.ge.9) tgcut = 0

4.10 ntlimits.F

Added section on Active Degrader arrays. Added section on kinked variables.

4.11 setup_tg.F

12-Jan-2005 call to study_cer - adds cerenkov hits to ntuple. Jim Frank changed code relating to the high-gain CCD target hits for pileup cut. Added TG fiber track info (tgf_arc, range_tg, fiber_no) Changed the maximum number of kaon,pion hits in the target from 100 to 50. Used new parameter tt_hit_par as the input, so that future changes would be transparent. x = x + zsl(ivert)*zpi !move each row this amount.

4.12 pass1_define.F

Added HBNAME calls to P1TRIG, TGscat, TGToshio, TGfit,KToshio, Kinkfit

4.13 .F

4.14 pass2_define.F

Calls to HBNAME for Cerenkov hits, AD-CCd fit and pulse

4.15 tr2unp.F

24-Jan-2005 IC Unpack L1.2 bits as per Norihto

4.16 get_tim_e949new.F,set_targetccd4.F,fcn_ttccd4_nodivdif.F

Reformatted so that it would be possible to read the code without going blind.

4.17 minu_ttccd4_nodivdif.F

Some lines that were commented out are now active. Including a call to mnexcm and a call to mnerrs in a loop.

4.18 study_cer.F

Created this routine.

4.19 swathccd.F

18-October-2004 BL Added a check to determine if swathccd's reconstruction is acceptable. Reformated a few lines to be able to read the code easier. Added section to call tgconstructor if swathccd fails or if it fails the swath_bad_check function.

4.20 fcn.F

i1 = n-hwind is changed to i1 = max(1,n-hwid)

4.21 bstime.F, bstime_ccd.F, bstime_atc.F

Remove dependence on iqual_swccd.le.1

4.22 get_tim_e949post.F changed to get_tim_e949post2.F

22-September-2003 Added section to add htis that were not found on first round primarily when ccd time was present but far away from tdc time.

4.23 setup_beam.F

LTMB(NLTBM = ... - 7000. changed to - 74436.4 LTBMX(NLTBM) = I - 12 changed to LTMBX(NLTBM) = I

4.24 tgrphi.F

Updated the z-slope correction for the TG.

4.25 rdt_anal.F

a call to HF2() was effectively commented out (only called when debugging).

4.26 bl_tdcunp.F

18-May-2004 DV Time window is replaced by fgate function.

4.27 blt_anal.F

Created

4.28 tdcunp.F

The call to RDTUNP was changed to a call to the new routine TDXUNP.

4.29 rdtunp.F was changed to tdxunp.F and modified

03-May-2004 DV the routine got a new name and BL is added. (major 21-Oct-2004 BL Added unp_bl/unp_rd variables to fix bug. The bug was if RD was unpacked then BL would not be unpacked because the event would have been registered as not a 'newevt'

4.30 tdunp.F

The call to RDTUNP was changed to TDXUNP.

4.31 anal_bm_ccd.cmn

Removed b4puld,ckpuld,cpipuld from ccdpulse_info common block to save space in the ntuple. Changed adpuld(40,12) array to be able to save all 12 channels of the Active Degrader CCDs if necessary. Also, added offadpul(12) to keep track of the offset in the AD CCDs, info stored in adpuld is zero suppressed.

4.32 p2_phveto.cmn

Added parameter MAX_AD_CCD_HITS and assigned it to 80. Also added AD CCD hit info: tpvad2,epvad2,elempvad2,npvad2. Added flag for BL tdc/td times: bltdc1,bltdc2(MAX_BL_HITS)

BUG: tpvdp's dynamic range was [-100.,100] (missing a decimal) changed to [-100.,100.]. Changed the dynamic range of itqg from [0,4] to 0,5]. Changed the dynamic range of epvad from [0.,100.] to [0.,500.] and epvadpr from [0.,100.] to [0.,1000.].

4.33 intsen3.cmn

tdcsastbl,tdcbastbl,tdc1sabtbl,tdc2sabtbl,tdc1nabtbl,tdc2nabtbl

4.34 p2_target.cmn

02-Feb-2005 BL Changed array sized for TG hit info from 100 to tt_hit_par=50. Added addtional variable describing the track thru the fibers.

4.35 pass1.cmn

28-Oct-2003 BL Added stuff for tgrecon.F 01-Apr-2003 BL Added tigqualt2 array to determine how swathccd works at various stages. 14-Mar-2005 BL Changed tdaic_o, tdaic_i limit from [0.,20.] to [0.,50.] as used in setup_pass1.F Store l0z2 Changed the dynamic range of itgqualt, etg, rtg Added section for TG scatters.

4.36 sqgeomd.cmn

Added scnt0(24,23), ycnt0(24,23), xatic, yatic, zatic

4.37 tr2bits.cmn

24-Jan-2005 IC add detailed L1.2 bits lastVSN, lastSA, inv_add, HEX_after

4.38 ccdfitres.cmn and lccdfitres.cmn

Changed dynamic range of (l)nfitfib [0,15] to [0,31] (l)nfitdoub [0,15] to [0,31] (l)singltim [-10.,50.] to [-30.,50.] (l)doubltimk [-10.,50.] to [-30.,50.]

4.39 .cmn

5 Further Changes After 1^{st} PNN2 Ntuple Production

5.1 oveflow_bm.F

Found error with ddd debugger "Subscript out-of-range on L71. Attempt to access the 41st element of *thepul*." Error due to AD system (isys=3) not setting *enrg* to a valid value.

5.2 tgpfcn.F

Found error with ddd debugger "Subscript out-of-range on L93. Attempt to access 0th element of *xco*(subscript 1 of 3." Error a result of code change to removed K/Pi fiber hits from Toshio's fitter. Fixed error by not incrementing index when a K/pi hit occurs.

5.3 icrnge.F/setup_pass1.F

Found error with ddd debugger "Subscript out-of-range on L93. Attempt to access 0th element of *icthit*(subscript 1 of 2). Error is the result of undefined values due to a bad UTC fit. In *icrnge.F* implemented a direct array bounds protection. In *setup_pass1.F*, I changed the conditions when *icrnge.F* is called; Now only done when *swathccd* is successful, which requires a good UTC fit.

6 Ntuple Variables Changes

6.1 pass1.cmn

tchi1-7, tx0, ty0, trad

6.2 p2_beam.cmn

Added adpuld(40,nadpuld). Will store all channels with any non-zero CCD hits. offadpul(nadpuld) stores the bin offset of the CCD zero suppression. Removed for space considerations b4puld,ckpuld,cpipuld which all had (40,3) as the dimension. Changed dynamic range of ADhit from 0-50 to 0-80. Changed dynamic range of ltbmx from 0-8 to 0-16. The array ltbm was stored a real but had a integer range. Changed from [-1000,1000] to [-1000.,1000.].

6.3 p2_phveto.cmn

tpvad2,epvad2,elempvad2,npvad2 = AD CCD info tdcsastbl,tdcbastbl,tdc1sabtbl,tdc2sabtbl,tdc1nabtbl,tdc2
= BL tdc/td flag.

itgqualt2(6) added to keep track of swathccd return values at each swathccd called. l0z2

7 Conclusions